Initial Report on Discovery of Ordovician Scolecodonts from Eastern Australia.

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Scolecodonts recovered from conodont residues of a Late Ordovician (Eastonian) limestone block contained in the Wisemans Arm Formation include a range of elements and represent the first documented Ordovician scolecodont fauna from Australia.

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INTRODUCTION

A clast of limestone from volcaniclastic conglomerate in the Wisemans Arm Formation (Leitch and Cawood 1980) at Roscommon, east of Manilla (Fig. 1) has yielded a small fauna of scolecodonts as a by-product of conodont extraction. The conodont fauna is Late Eastonian (Ea3) (Furey-Greig 1999), and correlates with faunas documented from Ea3 horizons in the Lachlan Fold Belt (eg. Trotter and Webby 1995; Zhen et al. 1999). Little has been published on Palaeozoic polychaete microfossils from Australia. The present report is provides documentation of a scolecodont fauna from a residue of known age.

The olistostromal Wisemans Arm Formation (Leitch and Cawood 1980) is a fault-bounded unit within the structurally complex Tablelands Complex of the New England Fold Belt (Fig. 1), that crops out between Nundle and Warialda. The Wisemans Arm Formation is characterised by volcaniclastic sandstone and siltstone, rare radiolarian mudstone, and conglomerates and olistostromes containing masses of mafic and intermediate volcanics, limestones of Late Ordovician and Early Silurian ages (Furey-Greig 1999; in press) and chert.

Standard acetic acid dissolution of limestones at the Macquarie University Centre for Ecostratigraphy and Palaeobiogeography, and separation of residues using the method of Anderson et al. (1995), yielded scolecodonts and conodonts. Illustration was entirely digital using the method described by Furey-Greig (1999). Some vacuum-induced damage was sustained by the specimens, hence no attempt was made to re-position the fragile microfossils in case of further damage. Terminology used herein is based on that of Kielan-Jaworowska (1966).

FOSSIL POLYCHAETE TAXONOMY

Historically, the common occurrence of scolecodonts (the acid-resistant jaw elements of polychaete annelids) as disarticulated, dispersed elements in Palaeozoic acid-insoluble residues led to development of a complex form taxonomy along similar lines

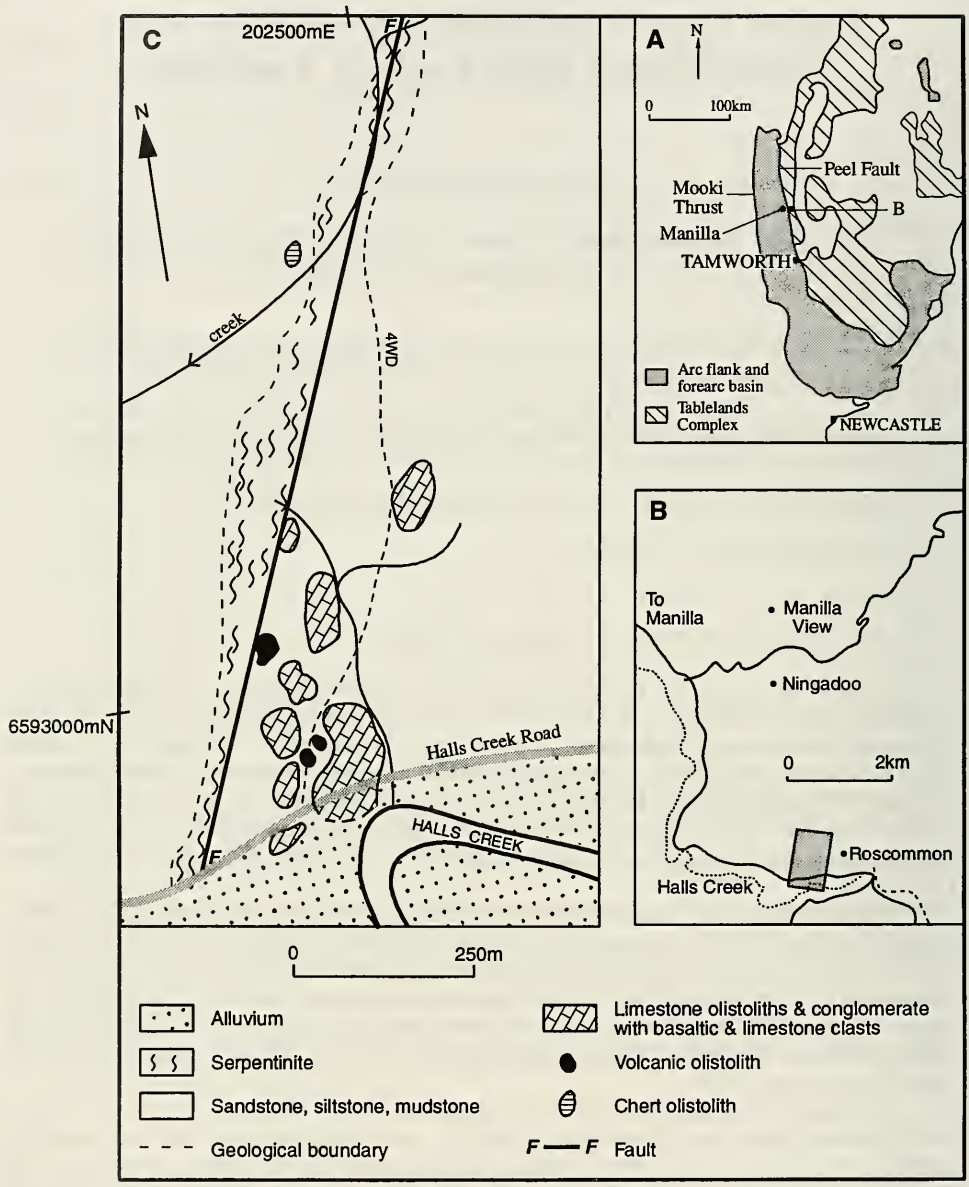

Figure 1. A. Major structural elements of southern New England Fold Belt; B. Location of study area; C. Geological map of Roscommon olistostrome. Grid co-ordinates in Australian Metric Grid System.

to the early study of conodonts. This led to problems in reconciling that system with documented natural assemblages (eg., Jansonius and Craig 1974). The complication of early, premature attempts at reconciling the two systems, and subsequent advances in this area, were discussed in detail by Eriksson and Bergman (1998). Several multi-element scolecodont studies have provided a basis for improving the taxonomic situation (eg, Kielan-Jaworowska 1966; Jansonius and Craig 1974; Bergman 1989). It has been

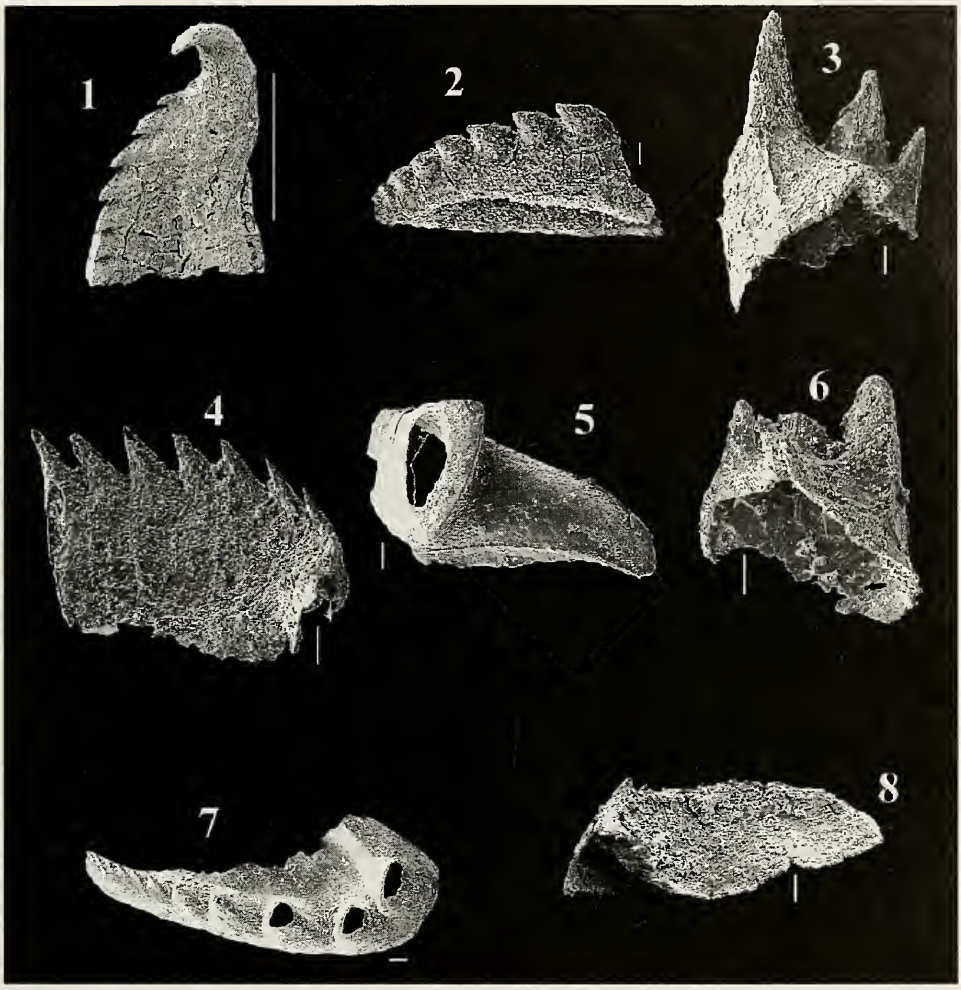

Figure 2. Scale bars items 2–8 = 100 microns, item 1 =1mm. 1. Right MI element, lateral view. 2. ?broken MII element, lateral view. 3, 6. M4 elements, lateral views. 4. ?Basal plate, lateral view. 5. unassigned element, dorsal view. 7. M2 element, lateral and dorsal views. 8. broken element.

shown in these and other reports that only a small number of scolecodont elements, the MI and MII, are genus or species-diagnostic (see Szaniawski 1996 for a detailed review).

The stratigraphic value of Palaeozoic scolecodonts is hampered by their strong relationship with facies (Szaniawski 1996) and by the lack of stratigraphic information in many publications (Eriksson and Bergman 1998). One exception is Hints' (1998) report on solecodonts from the Caradoc of Estonia and the St. Petersberg region. It is hoped that this preliminary report on Late Ordovician scolecodonts from Australia, well constrained as to age, will lead to further documentation of such faunas, for scolecodonts are known to occur in other eastern Australian Late Ordovician conodont residues (Percival 1999; Zhen, pers. comm.).

DISCUSSION

The fauna from Roscommon numbers forty elements and includes only one broken dextral Mandible 1, generally accepted as being the genus-diagnostic element. This is insufficient for precise taxonomic assignment and the material is here left in open nomenclature. Nevertheless, some comparison with documented Ordovician material is appropriate. The M1 element (Fig. 2, item 1) features a pronounced falx and edentulate falcal arch and is comparable to jaws of Atraktoprionidae illustrated by Kielan-Jaworowska (1966, plates XXX1–XXX1V), and by Hints (1998, Fig. 16). The other elements may belong to one or more species and are illustrated for future comparison.

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